WHAT IS CLAIMED IS:

1. A demodulation apparatus for demodulating modulated signals, the apparatus comprising:

a digital signal generator for performing synchronous detection of a modulated input signal and for making an A/D conversion to generate digital signals corresponding to phase axes;

a frequency correction value outputting unit for outputting a frequency correction value set on the basis of a symbol rate;

a frequency corrector for giving a frequency offset to the digital signals on the basis of the frequency correction value to generate frequency-corrected signals;

a timing recovering unit for performing timing recovery by extracting symbol timing for the frequency-corrected signals;

a C/N detector for detecting C/N from a symbol obtained by the timing recovering unit;

an optimum frequency correction value determining unit for treating a frequency correction value corresponding to the maximum value of the C/N as an optimum frequency correction value;

a carrier recovering unit for performing carrier recovery by correcting finally a shift in the frequency of a signal on which a frequency correction by the use of the optimum frequency correction value and timing recovery have been made; and

a synchronization detector for making an error correction on a symbol after carrier recovery and for detecting a unique word.

2. The demodulation apparatus according to claim 1, wherein the C/N detector detects C/N, in the case of performing carrier pull-in control, from a symbol which depends on the shift in frequency, and detects C/N, after carrier pull-in, from a symbol which does not depend on the shift in frequency.

3. The demodulation apparatus according to claim 1, wherein the C/N detector detects the C/N on the basis of dispersion in the direction of symbol amplitude.

4. The demodulation apparatus according to claim 1, wherein the frequency correction value outputting unit updates a frequency correction value by a frequency value being smaller than the pull-in range of the carrier recovering unit.

5. The demodulation apparatus according to claim 1, wherein the frequency correction value outputting unit updates a frequency correction value by a frequency value being greater than the pull-in range of the carrier recovering unit.

6. The demodulation apparatus according to claim 5, further comprising a shift detector for detecting the shift between a signal on which a frequency correction by the use of an optimum frequency correction value determined on the basis of the frequency correction value greater than pull-in range and timing recovery have been made and the pull-in range of the carrier recovering unit.

7. The demodulation apparatus according to claim 1, wherein the frequency correction value outputting unit outputs a frequency correction value being greater than the pull-in range of the carrier recovering unit before determination of the optimum frequency correction value and outputs, on the basis of a synchronization detection signal, a frequency correction value being smaller than the pull-in range after determination of the optimum frequency correction value.

8. A broadcasting system for communicating digital satellite broadcasts, the system comprising:

a broadcast sending apparatus including:

a modulator for modulating a signal to be sent to generate a modulated signal,

an up converter for converting the modulated signal to a radio signal, and

a sending unit for sending the radio signal to a satellite via an antenna; and

a broadcast receiving apparatus including:

a receiving unit for receiving a signal sent from the satellite to the ground,

a down converter for converting the frequency of a signal received to generate a signal to be demodulated,

a digital signal generator for performing synchronous detection of a signal output from the down converter which was modulated on the sending side and for making an A/D conversion to generate digital signals corresponding to phase axes,

a frequency correction value outputting unit for outputting a frequency correction value set on the basis of a symbol rate,

a frequency corrector for giving a frequency offset to the digital signals on the basis of the frequency correction value to generate frequency-corrected signals,

a timing recovering unit for performing timing recovery by extracting symbol timing for the frequency-corrected signals,

a C/N detector for detecting C/N from a symbol obtained by the timing recovering unit,

an optimum frequency correction value determining unit for treating a frequency correction value corresponding to the maximum value of the C/N as an optimum frequency correction value,

a carrier recovering unit for performing carrier recovery by correcting finally a shift in the frequency of a

signal on which a frequency correction by the use of the optimum frequency correction value and timing recovery have been made, and

a synchronization detector for making an error correction on a symbol after carrier recovery and for detecting a unique word.

9. A broadcast receiving apparatus for demodulating modulated signals for a digital satellite broadcast, the apparatus comprising:

a receiving unit for receiving a signal sent from a satellite to the ground;

a down converter for converting the frequency of a signal received to generate a signal to be demodulated;

a digital signal generator for performing synchronous detection of a signal output from the down converter which was modulated on the sending side and for making an A/D conversion to generate digital signals corresponding to phase axes;

a frequency correction value outputting unit for outputting a frequency correction value set on the basis of a symbol rate;

a frequency corrector for giving a frequency offset to the digital signals on the basis of the frequency correction value to generate frequency-corrected signals;

a timing recovering unit for performing timing recovery by extracting symbol timing for the frequency-

corrected signals;

a C/N detector for detecting C/N from a symbol obtained by the timing recovering unit;

an optimum frequency correction value determining unit for treating a frequency correction value corresponding to the maximum value of the C/N as an optimum frequency correction value;

a carrier recovering unit for performing carrier recovery by correcting finally a shift in the frequency of a signal on which a frequency correction by the use of the optimum frequency correction value and timing recovery have been made; and

a synchronization detector for making an error correction on a symbol after carrier recovery and for detecting a unique word.